

A
PLAIN ACCOUNT
OF
VACCINATION;

DESIGNED FOR THE HEADS OF FAMILIES, WHEREIN THE
HISTORY, ADVANTAGES, AND ERRORS OF THIS
SUBJECT ARE POPULARLY TREATED.

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Ce que fait la Richesse, et assure les progrès d'une
science, ce sont les observations.

CUVIER.

LONDON :
RENSHAW AND RUSH, 356, STRAND.

1833.

Wm. Davy, Printer, Gilbert-street, Grosvenor-square.

PREFACE.

IT is unnecessary to say that it would be alike incompatible with the design and size of the following Essay to enter into minute disquisitions respecting disputed points. The object of the following pages being to instruct the general reader in regard to the main features and ADVANTAGES of Vaccination, the author has rather aimed at compressing results, instead of expatiating into wide

and doubtful enquiries: which he hopes will be a sufficient apology to any medical reader, into whose hands these pages may happen to fall.

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INTRODUCTION.

THE knowledge and introduction of VACCINATION ought, undoubtedly, to be regarded as the most important event of modern times. No discovery can be pointed out which has come home with such immediate force to the feelings of Society ; nor any which has borne with the same importance upon the substantial happiness of mankind. The benefits are alike accessible to the rich and poor, and have extended to the remotest parts of the globe. It has created a new æra in respect of the public health ; and, we may also add, that its benefits are *progressive*, for it aims at the total extinction of a disease, from which

many parts of our land are suffering at this *present time*. A subject of so great importance, has naturally attracted a large share of public attention, and employed the pens of many able physicians.

But the question is *still* often put, What are its *advantages*? and what is the degree of *protection* which it affords against the attacks of small pox? for, although many of the earlier prejudices against its introduction have been dissipated, new objections have arisen, and fresh doubts have been inspired, which, from time to time, have tended to shake the confidence of the public, and to create, in the minds of many thinking persons, considerable distrust of its efficacy. Conceiving such to be the case, we imagine that a plain account of the disease, divested as much as possible of technicalities, will not be unacceptable to the general reader; who, if he will give himself the trouble to examine the plain facts of the case, will be at no loss to form as judicious

an opinion upon the subject, as any medical man, and may free his mind of those vague doubts as to its propriety, which it is certain that many persons still continue to entertain.

The History of Vaccination.

Dr. JENNER is well known to have been the first person who investigated, with method and genius, the subject of cow pox ; and to him is unquestionably due the merit of having recommended the practice to general adoption. He was surprised to find that there were many persons, in the dairy districts of Gloucestershire, who manifested a determined resistance to the inoculation of small pox ; and that, notwithstanding he repeated the attempts, such persons uniformly failed of taking the disease. Local knowledge and popular tradition had attributed this resistance to certain festerings, which those, who were employed in milking the

cows, had contracted from the teats and udders of the animals. Dr. Jenner was led to meditate upon this fact, and to institute minute enquiries respecting the accuracy of the phenomenon thus generally brought to light. In May 1796, he performed his first decisive experiment, of inoculating a healthy boy from the hand of a dairy-maid ; and subsequently of inoculating the same boy with the matter of small pox. This, as well as a great many other experiments which followed, so completely answered the expectations which he had formed, that in the course of two years he was enabled to present the collected results of his experiments before the public.

The Public hailed with all desirable enthusiasm an announcement of so much promise. Further investigations of the subject were immediately commenced in London and other parts, and these brought to light many facts, which, at first sight, seemed to militate against the statements of Dr. Jen-

ner, as well as many others, which he was not acquainted with—but in proportion as these were enquired into, the fallacy of the inferences to which they gave rise was detected, and the original truth of the preservative powers of cow pox confirmed and established upon the most convincing evidence.

We have already adverted to the fact, that the material part of this discovery was already popularly and traditionally known; to which we may add, that Messieurs Sutton and Fewster, so far back as 1768, had made the same observation, and had even gone so far as to make experiments upon the subject, which they communicated to a medical society: and still more to the purpose it is related, by those celebrated travellers, Messieurs Bruce and Humboldt, that among the Eliaats of Persia, and the inhabitants of the Corderillas in South America, the practice had prevailed from a very high antiquity, or at any rate that

their knowledge of the protective powers of vaccination, in regard to small pox, was considerably antecedent to our own:—so far illustrating the observation of the wise man, who declared that “there is no new thing under the sun:” not however that these circumstances in the smallest degree detract from the high honour and credit which are unquestionably due to Dr. Jenner.

The cow pox has been supposed to derive its origin from the *grease* of horses; which consists of a vesicular eruption, accompanied with tumefaction, in the situation of the hoof. The identity of these diseases was for a long while doubted in consequence of repeated attempts to vaccinate from this source having failed; but the fact has been established by subsequent experiment: and it has been further asserted, by a pupil and assistant of Dr. Jenner, that this gentleman derived his exclusive supplies from this source during the latter years of his life. However this may be, the fact of the

identity of these diseases remains the same. It has also been reported, that goats are subject to the same disease, and that it may be communicated from them to man; but it would be desirable that this fact should be confirmed.

Time and Manner of Vaccinating.

It is probably owing to the extreme mildness of the disease, that cow pox is not communicable by atmospheric contagion, and that the actual application of vaccine matter, to an open surface, is necessary before the disease can be received; in which respect we may observe the strong analogy which exists between it and the milder forms of modified small pox, to which the same observation may be applied. The most eligible time for vaccination is from the second to the eighth month—a period of life at which children are least of all subject to

many eruptions of the skin, or to those disorders of the bowels, which commonly attend the process of teething: at the same time that it possesses the additional advantage of screening them at this tender age, against the approaches of small pox. But, should the disorders to which we have adverted, or any others, exist at this time, it will be prudent to employ the proper remedies to get rid of these before the operation is performed, for reasons which we shall more fully discuss presently.

The vesicle from which the supply is taken should be of the seventh or eighth day,—full and unbroken, from a healthy child, and not, as is too frequently the case, previously robbed of its contents. With a sharp broad shouldered lancet, thoroughly imbued with the virus, the surgeon should make several punctures of the skin—either in the upper part of the arm, which is usually protected by the dress, or in the inner and upper part of the calf of the leg: al-

ways having regard to the thickness of the skin, that he may neither fail of his purpose by too deep or too slight a puncture, nor wound the feelings of the by-standers. The punctures should be oblique, and directed from above downwards, that the lymph may gravitate as it were into them, and, at the same time, be protected from being rubbed away. It is very proper however that they should be protected during the whole of their progress, by a soft covering, to guard them from accidental injuries.

In small provincial towns, it is scarcely possible to preserve a constant supply of lymph; and recourse, in such cases, is usually had to the Metropolis; from whence it is obtained on points or glasses in a dry state. A far more certain method however consists in collecting it in a fluid state, in small capillary tubes, which are subsequently sealed hermetically. In this state it will preserve its virtues for an indefinite length of time; and is transmitted, by the

National Vaccine Board, to the Colonies. There are various methods of thus collecting the lymph, but the most simple consists in warming a minute tube, terminated by a bulb : the open extremity of the tube is now inserted into the vesicle, and the bulb is slightly blown open by the breath, when the fluid necessarily ascends into it. The flame of a common candle is sufficient to seal it.

Vaccine matter obtained in this manner constitutes, we are informed, an article of commerce with druggists and foreign merchants.

Description and Progress of the Disease.

AFTER a period of from twenty-four to thirty-six hours, we may observe by the aid of a microscope, minute vesicles in the situation of the punctures : about the third

day they are easily distinguished by the naked eye, and present a slight tumefaction and redness: by the fifth and sixth days they are become much more distinct, and are characterized by depressed centres; at the same time that a narrow red circle surrounds their bases: the red circle becomes broader on the seventh, and the vesicle itself assumes a silvery aspect: by the eighth day all the distinctive marks of the cow pox vesicle are fully exhibited—the cellulated structure, the central indentation, the areola of a half-an-inch radius, and a full state of distension from clear lymph: by the ninth or tenth day the areola has extended to an inch and a half radius, and the vesicle is found to have encreased considerably in dimensions, and to exhibit a nacrous lustre; at the same time that it imparts to the finger a feeling of greater hardness; a slight feverishness is generally experienced about this time, as also a slight sensation of pain and itching in the situation of the pustules; on which account it is sometimes difficult to

refrain from the application of the fingers : on the eleventh day the fluid of the pustules is completely turbid, of a yellow colour, and of a thick consistence : on the twelfth desiccation begins to take place, the little tumor begins to subside, the areola to grow pale, and the surrounding skin to peel off in little scales : by the fifteenth the areola has almost disappeared, and the process of vaccination may be said to be completed : the mahogany coloured crust which now forms, is generally found to fall off about the twentieth or twenty-fifth day, leaving a cellulated indented eschar, with a clear border, which may be compared to the impression of a thimble-top : the free contact of the air is necessary for the formation of the crust.

The vaccine vesicle is seated in the true skin, and consists of two concentric circles, one within the other, divided by radiated divisions ; which give to it a multilocular or alveolated structure.

Such is the course of genuine cow pox when it proceeds kindly: let us now consider

The irregularities and varieties of Cow Pox.

THE effect of advancing age in rendering the constitution less susceptible of all contagious disorders; and, on the contrary, of all depressing causes in exalting this susceptibility, is sufficiently ascertained by experience. That there are other causes, but of a more subtle and recondite nature, capable of the same effect, is also manifest from the subject of our present essay—namely, the reciprocal action of small pox and cow pox upon one another—for, whatever may be the nature of the change which is effected, it is clearly a matter of observation, that, the same individuals are, for the most part, incapable of receiving the two diseases, the one after the other. In the same man-

ner, it is found that some individuals manifest a permanent indisposition to receive either disease, while, in others, this indisposition remains only a certain time ; in others, there is an aptitude for one disease and not for the other ; and in others again, there is an aptitude for both ; all which peculiarities would seem to imply that certain changes of a permanent or fugitive nature are wrought in the constitution, by causes which, at present, we are unacquainted with. It occasionally happens that the period of incubation, as it is termed, or the period which elapses between the vaccination and the appearance of the vesicle, instead of being twenty-four or thirty-six hours, extend to twenty, thirty, forty, or more days ; or that, a former vaccination having failed, and a second having been performed, after an interval of one or two weeks, the second shall take effect, and give occasion to the formation of vesicles upon the punctures of the first : so that the two orders of vesicles shall observe the same progress,

and coterporaneously undergo the same changes:—on the other hand, the time which is required for the full maturation and desiccation of the vesicles is much shorter upon some occasions than it is upon others;—or the vesicle may not be produced at all, and the disease be manifested by general symptoms only. In such cases, we should not entertain the same confidence of the result, as if pustules had appeared, and gone through their regular changes; although there can be no doubt that, on some of these occasions, the constitution is quite as effectually protected.

The lymph of the primitive vesicles may accidentally be transferred to inflamed and abraded surfaces, and thus give rise to a secondary eruption; but it is important to be aware that a constitutional eruption is never the consequence of vaccination; which was one of the first errors committed in regard to this subject. The same individual is rarely susceptible of genuine cow pox a

second time, or of cow pox after small pox—the utmost effect which takes place in such cases being the formation of a small abortive vesicle, which quickly disappears.

In regard to the vesicle itself, there may be many irregularities. As for example when it bursts or suppurates in its earlier stages,—when it has a jagged or irregular circumference,—when it gives rise to a loose illconstructed scab, &c. &c.—in regard to all of which, it may be laid down, that they are calculated more or less to viti-ate the genuine object of vaccination, and ought to inspire us with distrust of its efficacy as a protection.—The varieties which are induced by the operation of small pox, we shall speak of in another part.

*Of Cow Pox complicated with other
Diseases.*

AMONG the most frequent of these we may reckon inflammation of the lymphatic vessels, and axillary glands: which rarely however, under these circumstances, proceed to suppuration. Painful and obstinate ulcerations sometimes occur in the situation of the vesicles upon the receipt of injury, or after the scabs have fallen off, or the areolated inflammation may be converted into erysipelas, and be propagated to the arm, neck and chest. The whole class of febrile diseases exercise an unfavourable influence upon vaccination: so that the disease is either suspended or modified, or else rendered totally inefficient. In some rare cases it has been observed to preserve its genuine type along with measles and scarlatina; but its co-existence along with various forms of cutaneous disease, not attended with fever, is much more frequently

observed; in which cases a very beneficial change is often wrought in these latter for the better. The charge that has been made, that cow pox is apt to lay the foundation of pulmonary consumption, rests on no better proof, than that the slightest fevers are capable of doing the same thing, in constitutions in which the seeds of the disease are already sown, and ready upon the smallest excitation to put on an active character: objections of this nature may be conceived against half the remedial measures which the practitioner has to deal with.

Of the causes of failure of Vaccination.

THAT the susceptibility of the constitution, to so virulent a contagion as that of small pox, should be destroyed, suspended, or modified by so trifling a matter as an inconsiderable pimple upon the arm, is a phenomenon which is justly calculated to excite

our astonishment: and the process, by which this is accomplished, must undoubtedly be regarded as one of great delicacy, and exceedingly liable therefore to interruptions from slight disturbing causes. Among these we may especially enumerate all febrile disorders, derangements of the alimentary canal, and cutaneous eruptions; which ought therefore to be sedulously repressed and guarded against: matter of too early or too late a date is very apt to communicate a spurious disease, upon which no reliance can be placed: but we suspect that the inconsiderate practice, of completely robbing the vesicles of their charge, has been a far more frequent cause of disappointment; and this is rendered probable by the recurrence of cow pox, in many of these cases by re-vaccination, as well as by the counter-fact, that the last of those persons vaccinated with lymph thus impaired and diluted, have failed in taking the disease; which, considering the inconceivably minute quantity of virus which is required for this effect,

is a species of proof which must be admitted to have some weight, although it is certainly not free from objections.

Compression of the vesicles before the sixth day, so as to induce suppuration; and, for the same reason, accidental injuries and abrasions, or the employment of blunt and rusty lancets, are found, upon many occasions, to render the operation inefficacious: a flow of blood, proceeding from too decided a puncture, may wash away the lymph, and also prove a cause of failure; in short, every irregularity in the progress and appearance of the vesicles, the absence of feverishness, or the want of an areola, should be regarded with suspicion; and will constitute a valid reason for repeating the operation; and indeed, when we consider the delicacy (if we may be permitted to use the phrase) of this process of the constitution, by which future immunity is obtained, as compared with the rudeness with which the operation is often times performed, and the

inattention with which it is afterwards watched, we shall rather feel surprised at the small proportion of cases of post-vaccine small pox which occur, than wonder that the immunity is less absolute than we had at first sight expected.

*Of the value of a well marked Cicatrix as
a proof of Protection.*

THE Reports of the National Vaccine Board have probably as much overrated the value of this sign, as the writings of some private individuals have depreciated it; undoubtedly it affords the best afterproof of the *regularity* of the process, upon which (as we have before observed) our principal dependence rests. Experiments of re-vaccination, and of inoculation for small pox, as well as experience, combine to attest the superiority of a well-formed, over an ill-formed cicatrix, regarded either as affording an absolute immunity from, or as more remarkably miti-

gating a post-vaccine small pox : in this respect corresponding with the well known fact, that the natural small pox affords a more perfect security against its own return than the inoculated ; because in the former case, the process by which the susceptibility of the constitution is destroyed, is more completely effected.

The cicatrix should be distinct, circular, and indented, in which case we do not believe that it is ever effaced by the future growth and expansion of the body ; although these circumstances will undoubtedly tend to expand its dimensions, and to render it less visible in proportion.

*Of the reciprocal influence of Small Pox
and Cow Pox upon one another.*

WE have already said, that as cow pox is a defence from small pox, so is small pox from cow pox.

If inoculation and vaccination are coterminously performed, the two diseases pursue their respective courses uninfluenced by one another ; but if the infecting matters are first mixed, the small pox obtains the mastery, and small pox eruptions come out. The reverse of this is said to have taken place on some rare occasions ; and on others, that the small pox has appeared on one arm and the cow pox on the other, thus dividing the victory ; but we suspect that there has been some fallacy in these experiments. The incompatibility of two different actions going on at the same time, and in the same part, was an opinion of Mr. Hunter's, so apparently self-evident, as to have passed into an axiom ; but the modifications which actions are capable of having impressed upon them from a variety of extrinsic circumstances are almost infinite ; at the same time that these modifications exhibit so wide a range of degree, that it seems almost impossible to say where Mr. Hunter's rule should begin or cease to be applied. We have examples of

such modifications in post-vaccine small pox, and in post-variolous cow pox; but it is very remarkable, that when the infecting matters are mixed, no *local* modification whatever is perceptible: the small or the cow pox, whichever it may happen to be, pursues its own course perfectly uninfluenced by the other.

If vaccination is performed within a short time before or subsequent to the *eruption* of small pox, the operation either fails altogether, or the vesicle which arises quickly disappears: but if a person has received the infection of natural small pox, not more than four or five days, there is every probability that the operation will succeed in preventing or modifying the eruption: for the latent period or time of incubation of natural small pox being, from ten to fifteen days, and the time which is required for the formation of the vaccine areola being only eight, the latter gets the start of the former, and in a manner expels it. This is a very

material circumstance, and enables us on many occasions to arrest the progress of small pox, in cases, where no reasonable doubt can be entertained of the infection having been received: on this account, and with a view of making this circumstance available in cases of greater urgency, it has been proposed to hasten the vaccine process by the multiplication of punctures and a more liberal introduction of lymph; which is asserted to have this effect; although we exceedingly doubt the correctness of this fact.

For the purpose of determining the exact period when we may consider the vaccine process to be accomplished, Dr. Sacco proceeded to vaccinate several healthy children, on the same day and from the same supply, and afterwards, on successive days, to inoculate them, one by one, in the opposite arms. The inoculations of the first five days he found to be effectual in the production of small pox eruptions; but of no effect in modifying the progress of the

cow pox. The inoculations of the sixth day, produced local pustules, which quickly disappeared; but no general eruptions. The inoculations of a later period were neither followed by general eruptions, nor by the appearance of local pustules. It would appear therefore, from these experiments, that the system is indisposed to receive the infection of small pox, after the sixth day of vaccination: but, for our own parts, we are more disposed to place our confidence in the appearance of the areola; which is not established before the eighth day. It will be observed that these results were obtained with *inoculated* small pox; the latent period of which is from six to seven days: but they correspond with considerable accuracy, with the statements which we have made in regard to *natural* small pox; the latent period of which is from ten to fifteen days.

The change, which is thus wrought in the system by cow pox, was believed by the

first vaccinators to be perfectly determinate, and to afford absolute immunity from the contagion of small pox : but further experience has proved this opinion to be incorrect ; and shewn, that the latter may sometimes occur under every shade of severity, and in cases too, where it is not possible to ascribe the failure of vaccination to any disturbing causes : —that as small pox and cow pox may recur in the same individuals, oftener than once ; so may cow pox after small pox, and small pox after cow pox : and further, that as the protection of *casual* small pox is greater than that of *inoculated* small pox, against a recurrence of itself ; so is the inoculated small pox than cow pox : and that consequently the protective powers of cow pox are the least to be depended upon of the three. Enthusiasm and pious frauds in the promotion of laudable and beneficial objects, are generally found to defeat their own aims, by the creation of a distrust and re-action, which are not easily removed ; and these, in good truth, are the principal difficulties which

vaccination has had to contend with. The temperate and true friends of vaccination, however, should not be afraid of disclosing the whole facts of the case; which will not only prove, as decisively as facts can do, the immense advantages of vaccination; but will serve to inspire a just reserve, in giving a too easy credence to the exaggerated reports of conversation.

Soon after the introduction of vaccination, many thousand selected individuals, both in this and in other countries, were submitted to vaccination; who, after a due interval of time, were, as it were, tested by the inoculation of small pox; but it was found that very few of these cases were capable of receiving both diseases. Hence it was conceived, that vaccination was an infallible preservative, when performed under favourable circumstances, and that all occasional instances of failure should be referred to some error or fault in the process, or to some disturbing cause. Under circum-

stances, however, of epidemic small pox, of peculiar virulency; such, for example, as that which occurred in Scotland, and the Northern counties of England, as well as on many parts of the Continent, in the years 1816-18, the proportion of the vaccinated who were attacked was so considerable as totally to dispel this hope. Mr. Cross, who has written an account of the epidemic which prevailed at Norwich, has stated the proportion of the vaccinated, who were subsequently affected with small pox, to have been as great as one in thirty: but this estimate is evidently inapplicable to the country at large.

In estimating the average liability to small pox after vaccination, we should take into our account not only the whole of the population, but also the mean liability of several years; as well those in which epidemic small pox has prevailed, as those in which it has not; and proceeding upon these principles, we consider that we should overstate the

proportion if we made it to exceed one in three hundred.

If we were to found our judgment upon the "Reports" upon the Continent, we should probably be obliged to reduce our estimate from one in three hundred to one in three thousand: and it should not be forgotten, that the statistical returns of continental Europe are, in general, far more minute and accurate than our own; and that peculiar facilities exist, in regard to this particular disease, in consequence of the establishment of public vaccinators. It is more desirable, however, that our conclusions should rest on English *data*: and, so far as the question of the advantages of vaccination is concerned, the average which we have assumed is abundantly sufficient for our purpose.

*Of modified Small Pox occurring after
Vaccination.*

POST-VACCINE small pox preserves, on some occasions, its genuine characters, when it resembles, in every respect, the disease which is contracted by inoculation. This resemblance, in other cases, is less distinct; but is still observable—in others, again, and in by far the greater part, the resemblance wholly ceases. In most of these cases, the disease is ushered in by a pretty sharp fever, which soon abates, and is not afterwards revived. The aspect of the eruption is changed—the central depressions are either wholly deficient, or they are only very indistinctly developed. Such of the pimples as mature do so very rapidly, and as quickly disappear; but a great many of them do not mature at all, or mature very imperfectly: so that, upon the whole, they seldom acquire their usual fulness of dimensions. It is not uncommon for them

to come out in successive crops. They also have a harder feel, and give rise to clear horny crusts; but, in all these respects, there is a great want of uniformity; nor is it possible on every occasion to distinguish between this and many other forms of eruption, unless by a consideration of the collateral circumstances of the case. That there is no mistake in imagining these to be forms of small pox, is clearly proved, from their contagious nature; which is manifested, in the severer cases, by the communication of the disease to others, in the natural way; and in the milder forms, by the communication of it by inoculation.

The disease with which it is most likely to be confounded is the chicken pox; which is also a contagious disorder, and in some of its forms very closely resembles it:—but the eruptions of chicken pox are generally larger—more distinctly vesicular—unaccompanied with hardness at the base, or the least appearance of central depressions, and

give rise to crusts of a light colour, and of a porous texture. Whatever doubts may remain, are generally cleared away by the discovery of any apparent source of varicellous contagion. It must be acknowledged, however, that the discrimination is not always so easy to make in practice, although a great deal will occasionally depend upon the correctness of our decision, in regard to the separation which it is necessary to enjoin between the inmates of boarding schools, and in families of young persons.

Of several erroneous opinions.

1. *The mortality of children from other diseases* is said to have *increased*, in proportion as the number of deaths from small pox has diminished; or, in other words, the average mortality of children, under ten years of age, is said to be greater, at the present time, than it was before the introduction of vaccination. This impression

originated in an inaccuracy of Dr. Watts'; and in order to be convinced of its falacy, it is only necessary to look at this gentleman's own statement in another point of view. From an examination of the Glasgow tables, for the years 1782 to 1788 inclusive, he found, that of the total deaths, 53.48 per cent. were of persons under ten years of age; but that for the years 1806 to 1812 inclusive, the proportion was encreased to 55.43 per cent.: and hence he concluded, that the mortality of children had encreased, during the latter of these periods, in the ratio of 55 to 53. But in this calculation he forgot to advert to the extraordinary decrease of *general* mortality which had taken place in the course of these periods—from 1 in 26.7, to 1 in 40.8; and therefore made no reference to the general population.

The truth however appears to be (from a comparison of the infantile mortality of these two periods with one another, in respect of the whole population) that the num-

ber of deaths, under ten years of age, diminished nearly one-third, during the latter of these periods—that is, of every one thousand persons, from 1782-88, 20.03 under ten years of age died annually; but of the same number, from 1806-12, only 13.58. The same result may be collected from the tables of the City of Berlin. From 1789 to 1803, one out of every four deaths of children was occasioned by small pox; but from 1820-22, one only out of seven hundred and eighty-five: and notwithstanding this prodigious decrease in the mortality from small pox, there was also a diminution of the mortality from *other* causes, in the proportion of 39 to 34. These are at once gratifying and convincing proofs of the increased value of infantile life: which, after making every due allowance for other concurring causes,* must mainly be attributed

* It will not perhaps be deemed altogether impertinent to our subject, to mention a few of the principal of those causes, which have contributed to this effect. Among these, we may especially

to the influence of vaccination, in not only directly shielding from the attacks of small pox, but indirectly from those other diseases of which small pox lays the foundation.

refer to the multiplied comforts of the lower orders, and their improved condition of life, as the result of increased commerce and industry:—the ameliorated condition of our towns and cities, in respect of cleanliness, drainage, and ventilation: the more commodious construction of houses: the use of linen next to the skin: the establishment of hospitals, and other similar institutions, in every part of the country: the more enlightened views respecting medicine and surgery; and, generally speaking, the superior education and skill of the members of these professions; not to mention a multitude of moral causes, which have tended to keep in active exercise the faculties of the whole community, by which hope has been stimulated, and fresh acquisitions continually made for its gratification. These are the proper fruits of PEACE; which has shed its blessings more or less over every civilized country, and proportionably extended the term of human existence. Within the short period of fifty years, the mortality of England and Wales has decreased from 1 in 40 to 1 in 62; and in London, since the middle of the last century, from 1 in 20 to 1 in 42 or thereabouts;

2. *The efficacy of vaccination has been supposed to cease after a period of three,*

and in Manchester, from 1 in 25 to 1 in 75; although the population of this latter place has more than quadrupled itself within these periods. Notwithstanding the variableness of an English climate, it is remarkable to observe the superior salubrity which it enjoys over the more favoured countries of the South. The rate of mortality for London, with its one million and half inhabitants, is not greater than that for the whole of France: while Naples, Rome, Florence, Leghorn, Nice, and the Southern States in general, exhibit a mortality, which is more than *twice* as great as that for England and Wales included. "The conservative tendency of an easy condition is strongly marked by the inferior degree of mortality, and of disease, which occurs among persons insured at the various life offices. The Equitable Office had always employed the corrected Northampton tables of the probabilities of life. But Mr. Morgan the actuary, found, in 1810, that the actual deaths which had occurred among 83,000 persons, insured during thirty years, was in the proportion of only 2 to 3 of what had been anticipated by the tables. The average mortality at this office from 1800 to 1820, was only about 1 in $81\frac{1}{2}$."—*Hawkins' Medical Statistics*,

ten, twelve, fifteen, or twenty-five years; according as it has pleased authors to decide: but the inference from so great a disagreement of opinion, as to the exact period of cessation, plainly is—that small pox has been observed to occur after vaccination, but at no definite periods; and that consequently, the rule which has been laid down, to repeat the vaccination in the intervals of these periods, is of no force: neither indeed would it be easy to persuade healthy individuals to submit to these repetitions upon any mere grounds of conjecture, and in the absence of any apparent sources of contagion. The common result of iterated vaccination is a mere *punctum* of inflammation, which, about once in three times, terminates in an imperfect vesicle, which quickly disappears, and is of no efficacy as a security; and this effect, it may be added, is more easily produced in the young than in those of adult age; which is contrary to the supposition objected. But we are not prepared to speak with the same positiveness of post-vaccine

inoculation; which may seem a very proper and prudential course to pursue during the prevalence of severe epidemic small pox.

3. *Deterioration of virus* has been adduced by others, as tending to account for the want of that uniform success, which is said to have attended the first vaccinators. The deterioration is supposed to be effected by the frequent transmission of the infecting matter through different individuals: which it is thought must necessarily modify its nature in one manner or another. Other diseases, it is said, have shewn a similar tendency to change their characters, and, as it were, to wear themselves out: while the same phenomenon is observed in regard to many epidemic diseases. But this question is easily decided by experience; and it is therefore unnecessary to adduce the parallel instances of small pox, scabies and syphilis, which may also be communicated by inoculation; but which have ever preserved their original and

genuine characters unimpaired by time. Dr. Thompson found that lymph, which had passed successively through nine hundred individuals at least, was capable of producing a disease identically the same, in every respect, to that which was produced by direct vaccination from the cow. Frequent comparisons of this sort have been made by others, and always with the same result. There is however no objection to this direct recourse to the cow, except that it is an inconvenient practice, and is said to be more frequently attended with painful ulcerations in the situation of the vesicles.

4. *The danger of communicating a new disease*, derivable from the constitution of the party supplying the lymph, has been much insisted upon by others, and has had great weight with the vulgar. Such an apprehension may be said to be instinctive, and must be ascribed to the vagueness of our knowledge in regard to contagion, which has ever proved a formidable source of alarm

to timid minds. This opinion also received strength from the errors of the first vaccinators, who, by vaccinating many persons who had already received the infection of small pox, or were living in an infected atmosphere, gave occasion to many varieties of modified small pox, which at that time were but very ill understood, and were supposed to be communicated by the persons supplying the lymph. The general answer however which we have to give to this opinion is, that the most sagacious practitioners have failed to observe any such consequences; which could hardly have happened, had the danger, from this cause, amounted to anything deserving our consideration.

5. *The identity of the origin of small pox and cow pox* has been maintained by several authors, and the reciprocity of protection, which they mutually afford, is thought to ground a presumption in favour of this opinion. It has been asserted, moreover, by a foreign writer, that articles of clothing,

imbued with the infection of small pox, have produced upon cows a genuine cow pox, capable of transmission to the human subject, and from one person to another; but this experiment requires to be confirmed. The distinctive forms which these diseases invariably preserve, and the repugnance which they manifest to any approximation of form, when they exist together in the same individual, would seem rather to imply an antipathy, than to countenance an opinion that they are simply different varieties of the same disease.

*Of the Mortality of Small Pox, modified
Small Pox, and Cow Pox, compared.*

IT is painful to read the history of small pox, and to trace the ravages which it everywhere left in its course,—the destruction of life, and the devastation of beauty, which it everywhere committed. It is computed that about a fifth or sixth of the whole

population were the victims of this pestilence, before the introduction of inoculation in 1722. The fatality, on some occasions, was considerably greater even than this.— So recently as 1816-18, the epidemic small pox which prevailed in Scotland, and in the North of England, is stated, upon good authority, to have swept off a fourth of all those who were attacked by it, and were not protected by vaccination: from whence it may be imagined how great would have been its ravages among a population *wholly unprotected*.

It is not indeed possible, under present circumstances, to conceive the incalculable benefits of inoculation; which, as it were, stayed the plague, and reduced the mortality from one in six, to one in five hundred, of those who accepted the benefit. Dr. Herberden emphatically writes:—"It is better to have it performed by any body, and in any manner, than to suffer small pox to come in the natural way, though assisted by

all the helps which art can afford." And yet so averse are the bulk of mankind to innovations, full thirty years were required to bring the practice into general operation.

Notwithstanding the great benefits of inoculation, there were certain evils, which indirectly flowed from the practice, which it was impossible to obviate. Under the former state of things small pox only existed epidemically, and there were intervals, (which on some occasions extended to several years), during which whole cities were exempt from its prevalence; but it must be evident, that the desire of parents to inoculate their children in early life, would have the effect of perpetuating and disseminating contagion in every part of the empire; and that consequently a great number of persons, who from imprudence or want of opportunity, had not been inoculated, would be exposed to all the hazards of casual small pox. In real fact the number of these cases amounted to a very

large proportion; and many persons, who were best acquainted with the imprudence and ignorance of the poorer classes, were led to the opinion, that inoculation had rather tended to extend than to lessen the evil: but this objection, though undoubtedly of weight, is not true to the extent which has been affirmed.

In estimating the dangers and inconveniences of small pox, we are not to lose sight of the possible recurrence of this disease, in the same constitution. The fact is now generally admitted on very numerous and respectable authorities; nor is there anything in the nature of the case which should lead us to doubt it. Dr. Thompson is of opinion, that secondary small pox occurs almost as frequently as post-vaccine small pox; and that the mortality of the former is to the latter as 13 to 1. We are not however perfectly sure that we understand the statements of this gentleman, whose experience is so widely at variance with the general experience of the

profession, both in this country and on the Continent: and, for our own parts, we are disposed to regard the occurrence of secondary small pox as a very rare event. According to the learned author, whom we have mentioned, secondary small pox occurs more readily after inoculation than after natural small pox, and within short periods of the first attack. In these cases the second disease is much milder than the first.

Having now stated the dangers of natural, inoculated, and secondary small pox, we will turn our attention to cow pox, and to small pox after cow pox. In regard to the former, we have little to say; for we are not aware of any well authenticated case of death arising from this cause. It is essentially a mild disease; and, unless complicated with other disorders, is incapable of producing so serious a consequence. In regard to the latter, we have the concurrent statements of Messrs. Thompson and Cross, who agree with extraordinary accuracy in

stating, that the mortality of post-vaccine small pox, as it occurred at Edinburgh and at Norwich, during the prevalence of violent epidemics, did not exceed 1 in 330;* and that of the rest, the disease was, for the most part, of a very mild kind; which seldom proceeded to the length of marking the skin. But if we were to make due allowance for the circumstances of an existing and violent epidemic, and for a close population, we should probably be obliged to reduce this statement very considerably, in order to make it applicable to common circumstances: but for the sake of argument, we will leave it as it stands, and the argument

* In the report of the National Vaccine Board for the present year, the following observation occurs.

“ We still live in hope that the good sense of the people will discover the superior advantages of vaccination, when it is repeatedly stated to them, as a fact, that of an equal number of persons vaccinated and inoculated, only so many of the former will be capable of taking the small pox afterwards, and that in a safe degree of the disease, as are found to die by the latter.”

will stand thus :—of every three hundred persons who are vaccinated, one person has the small pox, and of every three hundred and thirty who thus contract the small pox, one dies ;—in other words, the mortality of small pox after cow pox does not exceed 1 in 99,000 ; which is a degree of hazard, so exceedingly small, as would not, in the common affairs of life, be allowed to have the slightest influence upon our conduct.

It may, however, be enquired, why apprehensions, so contrary to the facts which we have stated, are so generally entertained ? This, we think, may partly be accounted for from the disposition, which everywhere exists, to exaggerate upon the vague reports of conversation ; as well as from the fact, that cases, such as we have alluded to, do not occur, diffused through the general population, but collected, as it were, into foci ; under circumstances well qualified to make a deep impression upon the public : we allude more particularly to the prevalence of

epidemics among the young of both sexes, at boarding schools, and among the poor of large towns, where the population is much crowded, and in a state highly favourable to the extension of disease: in both which cases, we can readily understand the tendency which popular prejudice on the one hand, and parental tenderness on the other, will have to warp the judgment, or at least to give a high colouring to the facts of the case—not to mention the disposition of human nature, to fall from a state of extreme confidence, which has been disappointed, into an opposite and equally unwarrantable state of want of it. We are not, however, by any means, bound to afford a full account of this popular error; which we have shewn to be inconsistent with experience, and irreconcilable with facts.

Conclusion.

UPON the supposition of the truth of the preceding statements, it is scarcely possible

not to perceive what great advantages vaccination possesses over inoculation. 1st. The cow pox is an exceedingly mild disease. 2nd. The contingent danger of small pox is only as 1 to 99,000. 3rd. The operation of vaccination may be performed at the most tender age. 4th. It never disfigures the body. 5th. It is calculated to extirminate small pox from among the human race.

The full weight of this latter reason cannot so well be estimated in a country like our own, in which vulgar prejudices are permitted to have their full sway, so far as respects any compulsory regulations, on the part of its government; or any decided efforts to eradicate existing ignorance, by the appointment of public vaccinators. But in some of the kingdoms of the Continent, where similar impediments do not exist, and where public measures of health are enforced, the check which has been given to small pox is more conspicuous; and still

more so, in some of the colonies and distant islands; where the existence of this disease is at present only known as a matter of history. The following is an official return of the deaths in Sweden.

In the year

1779	the small pox destroyed	15,000	persons
1784	.....	12,000	—
1800	.....	12,800	—
1801	.....	6,000	—
1822	.....	11	—
1823	.....	37	—

The expectation, therefore, of the complete eradication of one of the most fatal diseases of human nature, ought not to be considered as visionary. “Of all the diseases (says Dr. Thompson) to which human life is exposed, natural small pox is not only the most painful, but the most loathsome. It is impossible to witness the misery it occasions, and not to admire the discoveries, and revere the exertions, by which the hor

“ rors of such a malady may be almost, if not altogether, prevented.” Assuredly the antidote, which Providence has sent, to mitigate the horrors of so severe a pestilence, is an encouraging presumption in favour of the superior virtue of modern times ; which have pre-eminently enjoyed the blessings of health, and peace, and of knowledge, prosperity and independence. Doubtless the happiness of any people is proportionate to their virtue ; and it becomes, therefore, every one to admire and see, in these dispensations, the designs of a merciful Providence ; instead of factiously complaining of the evils of the nineteenth century.

FINIS.



